SFUND RECORDS CTR
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Whatever in the irrigation of any Ranch or Ranches, — — — — — — — — — — — And the Court doth hereby so order, adjudge and decree.

Provided, that the said petitioner Thomas K White shall within twelve months from the date of this Grant, layout and expend at least the sum of two hundred and fifty ($250) dollars in improving and using the rights and privileges hereby granted, then this Grant therefor shall be null and void and of none effect.

Provided also that before the delivery of this Grant, the said petitioner, Thomas K White, shall pay to the Clerk of this Court the sum of twenty-five dollars, for the use and benefit of Carson County Utah Territory.

J. S. Child } Probate Judge
J Williams } &
Wm Alford } Selectmen.

Utah Territory,
Carson County } To the Honorable, County Court in and for the County of Carson. Territory of Utah,

Your petitioners, J W Hastings, Wm Stewart and John B Winters, of the County & Territory aforesaid respectfully show to your Honorable body, that they are residing on the Carson River about 3/4 of a mile from China-Town in this County, at the place known as Hastings Quartz-mill, and are the owners of said Quartz mill, and improvements thereabouts, that they are the owners of the water rights acquired by Woodworth and Walsh, who located the said place on or about the 9th of July 1859. And who soon after, constructed a Quartz mill, propelled by water

power. Which water is taken from the Carson River by a Ditch, Flume, and Dam, the Dam being on said River, about two or three hundred yards above the aforesaid mill, and that said waters for the aforesaid purposes have been in use since 1857. by these petitioners and those under whom they claim.

Your petitioners would respectfully ask therefore, that to them may be granted, the right to use so much of the waters of said River for the propelling of machinery, along or on the line of their said Ditch, to the extent of the capacity of said ditch to the size of the enlarged portion thereof, and extending, and to be extended from their said Dam, in a direction down the river, to a point one mile from said Dam, and also the right to the possessory use of land or ground for said ditch, and to erect upon, and for the necessary use of machinery and building, to a point one mile from said Dam, and that a Grant may be made to your petitioners for the same, with the right to its exclusive and sole Enjoyment and use, to that extent so far as the same shall not conflict with the claims or rights, of any other person or persons, locating, or acquiring rights prior to those, as aforesaid, under whom these petitioners claim.

Respectfully. W. Hastings,
Wm Stewart and John B.
Winters. By their Atty.
Kelly Johnson

013110

United States of America
Territory of Utah, County of Carson

In County Court
September Term, A.D. 1860.

In the matter of the Petition of
W Hastings, Wm Stewart,
and John B Winters for Grant
of Water on Carson River,
near China-Town

On this 24th day of
October, A.D. 1860 the above Petition of W
Hastings, Wm Stewart, and John B Winters,
being called up, and after being duly exam-
ined and considered by the Court. It is hereby ordered
under and by Virtue of the Power, and authority
in the Court Vested, that the Petitioners be acceded to, And the Court do hereby
give and grant unto them, the rights and
Privileges therein Solicited. For the uses and
purposes therein mentioned. Provided that
Nothing in this Grant shall be so Construed
as to interfere in any manner with any
other rights acquired by location of any other
person or persons, prior to the location and
construction of the dams and ditch of the Peti-
tioners W Hastings, Wm Stewart and John
B Winters, nor to effect or impair any such
rights or claims to any Rancho or Ranches.
&c &c.
And Provided that this Grant shall not effect
or impair the rights now Existing to use the said
Water for the purposes of irrigation, and the Court
doth hereby Ordain, adjudge and decree.
Provided that unless the said Parties shall
within twelve months from the date of this Grant

01311

lay out and expend at least the sum of Five hundred Dollars, in improving and using the rights and privileges hereby granted, then this Grant therefor shall be null and void and of none effect.

And Provided, also, that before the delivery of this Grant, the said Petitioners shall pay to the Clerk of this Court the sum of Twenty-five Dollars, for the use and benefit of Carson County.

I. L. Child
J. Williams
Wm Alpord
} Probate Judge & Selectmen

Utah Territory
Carson County } ss.

To the Honorable the County Court of Carson County in the Territory of Utah.

The undersigned your petitioners would humbly represent to your Honorable body that heretofore, to wit, on the 28th day of November A. D. 1860, in conformity with law, they had surveyed and a plat of the same duly executed by the County Surveyor of said County of Carson, in order to claim and hold and enjoy all the water privileges of the same for Ditches, Mills and other purposes to which said Survey and plat reference is hereby made in the following certificate of the same, to wit:

Description and Plat of Survey of land lying on Gold Canyon about one and a half Miles below Silver City Carson County Utah Territory, Surveyed for Marcus Groselle.

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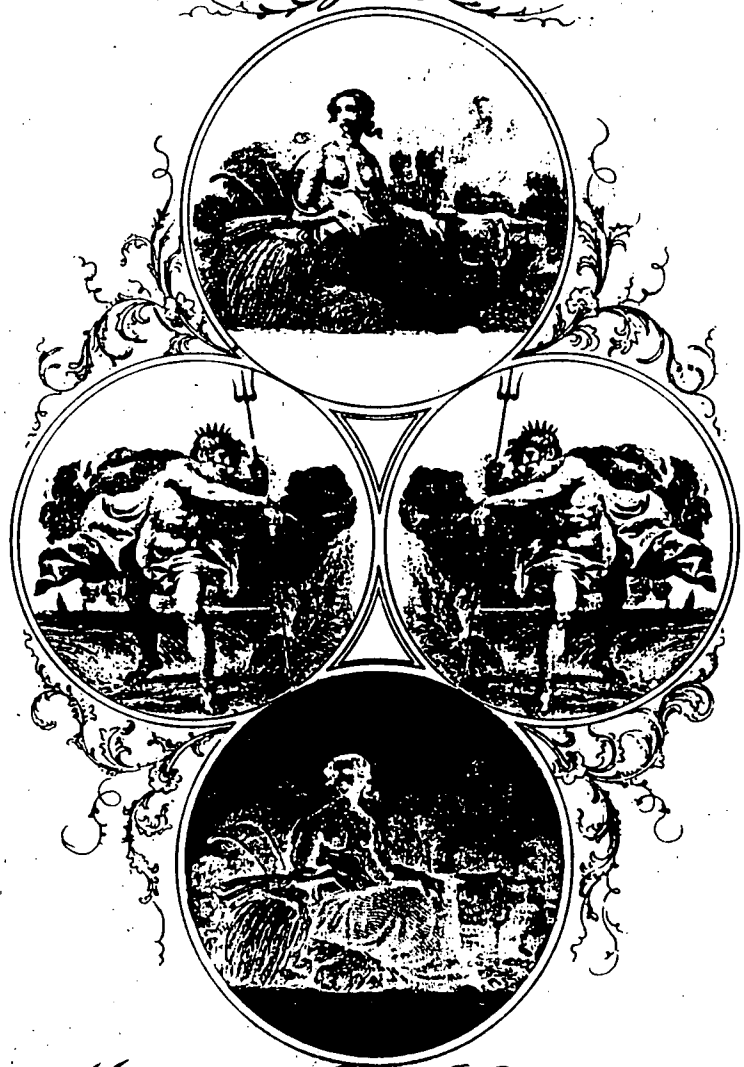
BRITTON & CO.
Lithographers.



Montgomery St. cor. Commercial
SAN FRANCISCO.

FIRST DIRECTORY OF

NEVADA TERRITORY

CONTAINING:
THE NAMES OF RESIDENTS IN THE PRINCIPAL TOWNS; A HISTORICAL SKETCH; THE ORGANIC ACT, AND OTHER POLITICAL MATTERS OF INTEREST; TOGETHER WITH A DESCRIPTION OF ALL THE QUARTZ MILLS; REDUCTION WORKS, AND ALL OTHER INDUSTRIAL ESTABLISHMENTS IN THE TERRITORY; AS ALSO OF THE LEADING MINING CLAIMS; AND VARIOUS MINERAL DISCOVERIES, WORKS OF INTERNAL IMPROVEMENTS, ETC, WITH A TABLE OF DISTANCES, LIST OF PUBLIC OFFICERS, AND OTHER USEFUL INFORMATION.

COMPILED FROM THE MOST RECENT AND AUTHENTIC SOURCES,
by J. WELLS KELLY

AND INCLUDING
SKETCHES OF THE WASHOE
SILVER MINES
by HENRY DE GROOT

Nevada
Coll.

INTRODUCTION
by RICHARD LINGENFELTER

THE TALISMAN PRESS
Los Gatos, California 1962

A-2

seven hands, and make use of the Patio process. J. N. Barton, superintendent.

SPROUL & Co's EXCELSIOR MILL—on the same side of the river, and a little below Barton's, runs ten stamps, with water-power sufficient to carry over a hundred. The water is conveyed to the mill through a ditch twenty-five feet wide and fifty-five rods long, being taken from a dam one hundred and seventy-five feet in width, the construction of both costing over five thousand dollars. The machinery is propelled by an iron turbine wheel five feet in diameter. The amalgamating process is conducted by means of twenty Hungarian pans, the company using a silver process of their own, which they believe will prove effectual. Fifteen hands are now employed, a number that will be increased with the contemplated enlargement of the mill; crushing rock from the owners' claim at Gold Hill. Proprietors, J. R. Sproul, C. C. Goodwin, Levi Hite, and J. R. Brett, the former being also superintendent.

CARSON RIVER QUARTZ MILL—Joseph Woodworth, Wm. Stewart, and John B. Winters, proprietors—is situated at a locality on Carson River known as Camp Woodworth, one and one half miles above Dayton. The mill, which contains ten stamps and four large arrastras, is driven by two turbine wheels, securing a large amount of power. The water is brought through a ditch twenty-three feet wide, and two thousand feet long. It employs ten hands, and crushes twenty tons of rock per day. The Hungarian bowls and the Hayden process are used. Company crush rock from their own claim—the Henderson—at Gold Hill. With its numerous outbuildings the establishment forms quite a hamlet, Mr. Mosheimer having a ten stamp mill immediately adjoining. The first quartz mill erected in the Territory was at this spot, having been put up by Hastings & Woodworth, in the fall of 1859. The first steam mill, as we have said, was put up by Mr. Paul, at Silver City, the following summer. The Carson River Mill is under the superintendence of J. B. Winters.

THE AURORA MILLS—owned by J. Mosheimer, John D. Winters, Joseph D. Winters, and G. Kustel—the latter superintendent, is located on Carson River, one-fourth of a mile south of Dayton. The establishment first started at this point was the four-stamp horse power mill of Logan & Holmes, started as has been mentioned in the fall of '59. It was a mere experimental work for testing the Gold Hill rock, and having answered its purpose, was superseded by a water mill the following summer. The present mill has three crushing departments, one supplied with ten, the other with twelve, and a third with sixteen stamps, which, in connection with three arrastras, crush forty tons of rock per day. The company employ forty hands, and crush their own rock from Gold Hill. In the amalgamating department they use the Hungarian bowls, the percussion and concentrating tables, barrels and pans, working for both gold and silver. The mill is driven by two turbine wheels of thirty horse power each. The water is brought through a race six hundred yards long.

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KELLER & Co's MILL—situated on the west side of the river, a few hundred yards below the Aurora, is sixty by seventy-five feet in extent; runs fifteen stamps, and four arrastras, crushing about twenty tons of rock per day. It is driven by a center-discharge wheel, employs eight hands, and works the ore for both gold and silver. Proprietors, Joseph Keller and Isaac Cohen.

SOLOMON & JACOBS' MILL—a little below Keller's, on the same side of the river, is a steam mill of small capacity, working ten arrastras, and employing about the same number of hands.

SUTRO'S MILL.—A few rods further down is a mill working ten hands. It has ten stamps, and crushes about twelve tons of rock per day.

THE DAYTON MILL—Ford, Berry & Co., proprietors—is situated at the lower end of the town of Dayton. The machinery of this mill is propelled by water. It now runs fifteen stamps, but the company have sufficient power to drive double the number, and the mill is soon to undergo a corresponding enlargement. They now employ six hands and crush

about fifteen tons of rock per day. Use in the amalgamating department the improved Hungarian pans. Their dam and flume are substantial structures, and were built at a heavy expense. The mill is under the superintendence of L. J. Carr.

THE MINERAL RAPIDS MILL—located on the west bank of Carson River, a few rods from the Dayton Mill, and owned by Colton & Smith, is driven by a forty horse power steam-engine, from the Vulcan Foundry, San Francisco. It runs ten stamps and four twelve foot arrastras, crushing twenty tons of rock per day. The Hungarian pans are used in working for gold, and Johnson's method for saving the silver. The proprietors do custom work and purchase ores.

THE ROCK POINT MILL—situated on the west bank of the river, one fourth of a mile below Dayton—is owned by Hugh Logan, J. R. Logan, James P. Holmes, and John Black. It is driven by water, and is one of the most extensive establishments in the country, the main building being ninety feet by one hundred feet, and the power equal to one hundred horses. It has forty stamps for fine, and two large ones for coarse crushing, and is capable of reducing fifty tons of rock per day, working it for both gold and silver. Thirty hands are employed, and in the amalgamating department sixteen of Varney's and thirty-two of Howland's pans are used. The tailings from these are subjected to the Patio process. The machinery is from the Miners' Foundry, San Francisco. The water is brought a distance of two thousand feet, nine hundred of which is through a flume ten feet wide and three feet deep. The dam is built of stone and timber, and with the race cost over ten thousand dollars. The entire cost of the establishment will be about seventy-five thousand dollars. The wheel is a ponderous structure, being sixteen feet in diameter, twelve feet breast, and furnished with forty buckets, which when full carry a weight of six thousand pounds. The mill crushes rock from the Logan & Holmes Claim, at Gold Hill, one of the best in that locality. The proprietors have constructed a new road for hauling down rock, which, besides shortening the distance over a mile, secures a better grade than the old route. Superintendents, Logan and Black. Builder, John Greentree.

A011027

FREEBORN & SHELDON'S MILL, formerly Shaw's, is situated on the east side of Carson River, three quarters of a mile below Dayton. The entire establishment is on a large scale, the building being seventy-five feet square, and the machinery driven by a Turbine wheel five feet in diameter, and weighing five thousand pounds, the heaviest of the kind in the country. The machinery is from the Vulcan Foundry, San Francisco. The mill, when run to its full capacity, will operate forty-eight stamps, twenty-four now being in use. The Norton pan and process are employed for amalgamating. The owners purchase their rock, employ fifteen hands, and crush about thirty tons per day. The ditch and tail-race are three quarters of a mile long, and cost six thousand dollars. The entire cost of the work will be about forty thousand dollars. William Freeborn and Mark Sheldon, owners; J. S. Akin, superintendent.

GAUTIER'S MILL, situated below Shaw's, on the same side of the river, is driven by water conducted through an expensive ditch nearly a mile long. It employs eight hands, and runs ten stamps, crushing fifteen tons of rock per day. Process is a new invention by Dr. Gautier, who superintends the mill. Owners, H. V. McCullough and L. P. Gautier.

THE SUCCOR MILL, one and a half miles below Dayton, on the west bank of Carson River, is driven by a six foot central discharge water-wheel, which carries fifteen stamps, capable of crushing twenty tons of rock per day. The building is sixty feet square, and very substantial. The water is brought the distance of half a mile through a ditch thirty feet wide. The company crush rock from their own lead—the Succor—on Gold Cañon, half a mile above Devil's Gate; employ twelve hands, and use Varney's pans for amalgamating. Mill superintended by J. B. Moore; owned by George Stead, Benjamin Ober, J. R. H. Waller, J. H. Moore, Henry Durant, Mr. Hobart, and Elliot J. Moore.

Historical Society

SECOND DIRECTORY

OF

NEVADA TERRITORY;

EMBRACING A

GENERAL DIRECTORY OF RESIDENTS

OF ALL THE PRINCIPAL TOWNS;

BUSINESS DIRECTORY OF ADVERTISERS;

QUARTZ MILLS, REDUCTION WORKS, TOLL ROADS, ETC.;

OFFICERS OF THE MASONIC, ODD FELLOWS AND SONS OF TEMPERANCE ASSOCIATIONS; MEMBERS WASHOE STOCK BOARD OF EXCHANGE; FIRE DEPARTMENT;

INCORPORATION ACTS OF VIRGINIA AND GOLD HILL;

AND ALL OTHER INFORMATION CONNECTED WITH THE PROGRESS AND PRESENT CONDITION OF THE TERRITORY;

ALSO,

AN ACCURATE TABLE OF DISTANCES; LIST OF PUBLIC OFFICERS; AND PRINCIPAL MINING LAWS OF DIFFERENT DISTRICTS; WITH THE RESIDENTS AND PRINCIPAL MINES, MILLS, ETC. OF THE

REESE RIVER REGION.

COMPILED FROM THE MOST RECENT AND AUTHENTIC SOURCES,

BY J. WELLS KELLY.

VIRGINIA:

1863.

Printed by Valentine & Co., 517 Clay and 514 Commercial Streets, San Francisco.

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with an engine room and wood-house attached, twenty by sixty-five feet. The engine is of forty horse power, drives four batteries of four stamps each, capable of crushing twenty-five tons of ore per day; two large stamps of one thousand six hundred pounds each, for breaking coarse rock, and fifty amalgamating pans. The grandest feature of this mill is the convenience of its locality, and the perfectness with which every department is constructed, thereby securing great economy in labor. The dump is an excavation in front of the batteries, twenty by fifty feet, capable of holding six hundred tons of rock; thus, when a load of rock is dumped from the wagon it is deposited immediately in front of the batteries, convenient for the feeder. Immediately below the batteries are eight large vats, into which the ore, after being crushed, is carried through troughs leading from the batteries, where it remains until thoroughly settled, when it is assorted and conveyed by means of a car to the amalgamating rooms below. As a matter of locality, convenience and durability, this establishment is unsurpassed by any mill in the Territory, and but few exceed it in capacity. In the rear of the building are four immense vats, each twenty by forty feet and eight feet deep, into which the slush from the drying department is deposited, thereby saving every particle of ore, an item in the saving process which commands the attention of mill owners. The company employ twenty-five men, and crush rock from the Gould & Curry mine. S. D. R. Stewart, Superintendent.

MARYSVILLE MILL—Messrs. W. T. O'Neale, Isaac and Samuel Glazier, and John Rule, proprietors—situated on Gold Cañon. Has nine very heavy stamps, weighing eight hundred and fifty pounds each. Engine of thirty-five horse power, from Marysville Foundry. Two boilers, one thirty inch and one thirty-six inch; two Chile mills, and thirty five-feet amalgamating pans, with steam chambers, from Vulcan Foundry, San Francisco. Work for both gold and silver, crushing twenty tons per day. Company have a process of their own, and employ fourteen hands. Purchase ore, and crush for customers. Superintended by W. T. O'Neale.

CENTERVILLE MILL—Douglass, Wheeler & Co. proprietors, situated on Gold Cañon, immediately below the Marysville Mill. Ten stamps, of seven hundred and twenty-two pounds each, propelled by a twenty-eight horse power engine, capable of reducing seventeen tons of rock per day. Use twenty-four pans for amalgamating, so arranged that steam can be introduced for facilitating the process. The pans are from the Miners' Foundry, and other machinery from the Fulton Foundry, San Francisco. Company employ twelve hands, have a process of their own, and purchase rock, or crush for customers. Building fifty-two by sixty feet.

SUCCOR MILL AND MINING COMPANY, Gold Hill District, situated at the Succor Mine. The owners are Judge R. H. Waller, Jos. H. Moore, E. J. Moore, Dr. Benj. Ober, Robert Hawxhurst, George Stears, James Grant and J. Kittridge.

This company had just completed a mill on Carson River, to run by water power, in the winter of 1862, when, during an unprecedented rise in the river, caused by heavy rains and the sudden thawing of snow on the mountains, the channel of the river changed, thereby destroying their valuable water power, and carrying away several hundred tons of quartz. The frame of the mill was removed to its present location, and additions made to the building, etc. It has now a sixty horse power engine, driving fifteen stamps, and is capable of crushing about twenty tons per day. The amalgamating pans were found to be imperfect, and the company are about substituting the Wheeler pans. Oren Belding was the builder of the mill, the workmanship and design of which is considered by competent judges second to none in the Territory. J. M. Moore is General Superintendent of Mill and Mine.

With the admirable car track arrangement, twenty-five tons per day can be delivered to the mill, by the labor of two men, at a cost of twenty-five cents per ton.

ST. LOUIS CO.'S MILL.—Is situated in Gold Cañon, one-fourth mile above Devil's Gate. Building fifty by sixty feet. Has four arastras and one of Broadhurst's Crusher's, capable of pulverizing twenty tons of rock daily; driven by a steam en-

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the "Sage Brush" process, with a twelve-feet iron arastra pan. Small though this concern is at present, the proprietors intend it shall be gradually enlarged, as circumstances shall warrant, and are now about adding a five-stamp battery and the Wheeler pans; having a sufficiency of water power attached to the mill to drive twenty stamps all the year round. George Blust, superintendent.

ISLAND MILL.—This mill is situated on the east bank of Carson River, about two miles above Dayton, and next above the Ophir Company's Mill, formerly the Carson River Quartz Mill. Is owned by Levi Hite, of Gold Hill. A. F. McKay, Superintendent. The mill consists of a ten stamp battery, made by the Marysville Foundry. The wheel is a central discharge, made by O. Crandall. There are at present ten five feet tubs, and the proprietor is now about adding ten additional tubs, and when completed will work about eighteen tons of rock per day. There has been built during the past winter, in connection with this mill, a solid stone dam, twenty-five feet wide, at an expense of $8,000. The cost of the mill and dam about $40,000. Mr. Hite has, in connection with his mill, a bridge across the Carson, connecting with a road leading to the innumerable wood ranches on the east side of the river, and the Sullivan Mining District, and Silver Mountain and Esmeralda. At this mill there is a peculiar kind of retort, of oblong shape, invented by James Montgomery, capable of retorting eight hundred pounds of amalgam at a time, and is considered quite an improvement.

At Camp Woodworth, about one and a half miles above Dayton, on the former site of the Carson River Quartz Mill, the Ophir Company, having purchased the extensive water right formerly belonging to the above establishment, are now making preparations to erect one of the largest mills in the Territory. We are unable to give any particulars, and can therefore but mention the fact of their having at the present time about one hundred and fifty hands employed, enlarging the tail-race, flume, etc. It will not be long before there will be quite a settlement at this place, as the site is one of the most pleasant on Carson River.

THE DAYTON MILLS—owned by John D. Winters, Joseph D. Winters, and G. Kustel—are located on Carson River, one-fourth mile south of Dayton. The establishment first started at this point was the four stamp horse power mill of Logan & Holmes, started, as has been mentioned, in the fall of '59. It was a mere experimental work for testing the Gold Hill rock, and having answered its purpose, was superseded by a water mill the following summer. The present mills have two crushing departments, one with twelve, and the other with sixteen stamps, which are capable of pulverizing thirty-five tons of rock per day. The company employ twenty hands, and crush ore from their claim in the celebrated Gold Hill Proper. In the amalgamating department they use six Wheeler pans and eight six-feet pans with steam chambers, working for both gold and silver. These mills are driven by two turbine wheels of thirty horse power each. The water is brought through a race six hundred yards long, and they have sufficient power for thrice the number of stamps employed. In connection with these mills is a large furnace for the roasting of such concentrated stuff as could not be reduced in the pans. This company has been singularly fortunate in keeping their mills continually running, and it is one of the most valuable properties in the county. G. Kustel and M. A. French, superintendents.

LINDAUER & HIRSCHMAN'S MILL—situated on the west side of the river, a few hundred yards below the Dayton Mills, is sixty by seventy-five feet in extent; runs fifteen stamps, and crush about fifteen tons of ore per day. This company own in the celebrated Gold Hill Proper, and keep their mill continually running on their own rock. The machinery is driven by a center-discharge wheel. Employ eight hands, and work the ore for both gold and silver.

SOLOMON & DAVIS' MILL—a little below the above, on the same side of the river, is a steam mill of small capacity, working ten arastras, and employing about the same number of hands.

SUTRO'S MILL.—(Adolph Sutro, proprietor)—situated a short

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distance below Solomon & Davis' Mill, is quite a feature in that vicinity. The works are surrounded by a high fence, and everything appears substantial. It is a valuable piece of property. Steam power is used in driving the machinery. Eight stamps and twenty amalgamating pans, also two roasting furnaces, twelve feet in diameter, capable of roasting one ton at a time. The proprietor has also an assay office attached to his establishment.

THE MINERAL RAPIDS MILL.—(Owned by A. Wade)—is located a short distance below the Sutro Mill, and is driven by a forty horse-power steam engine, from the Vulcan Foundry, San Francisco. It runs ten stamps, crushing twelve tons of rock per day. For amalgamating, have eight six-feet tubs, with steam introduced, and use Johnson's method for saving the silver. Does custom work, and also purchases ore. A. L. Johnson, superintendent.

THE DAYTON MILL—Is situated at the lower end of the town of Dayton. The machinery of this mill is propelled by water. It now runs fifteen stamps, but the company have sufficient power to drive double the number, and the mill is soon to undergo a corresponding enlargement. They now employ six hands, and crush about fifteen tons of rock per day. Use in the amalgamating department the improved Hungarian pans. Their dam and flume are substantial structures, and were built at a heavy expense. The mill is under the superintendence of H. A. Nall.

THE ROCK POINT MILL, is situated on the west bank of the Carson River, about one half mile below Dayton. This mill is driven by water power, and is one of the most extensive in the Territory. The main building is ninety feet in width by one hundred feet in length. It has eight batteries, of five stamps each—each stamp weighing five hundred and fifty pounds; also two breaking batteries, each having one stamp weighing seventeen hundred pounds. It has sixteen Varney Grinders, and thirty-two amalgamators each seven feet in diameter, and also a large steam boiler to furnish steam to the amalgamators.

The power is obtained from a large breast water wheel, twelve feet face and sixteen feet diameter, and also from a center-discharge water wheel seven feet in diameter. The water is brought from a dam, erected across the Carson River, a distance of twenty-nine hundred feet away from the mill. An admirable feature of this mill is its arrangements for saving labor, and so complete are these that from the time the rock is shoveled into the car in the interior of the mine, until it is in the battery, no shoveling is necessary. The rock is placed in the car at the bottom of the shaft, and from thence hoisted to the surface, and dumped into a box having an inclined bottom, with a trap door, which, when opened, allows the rock to pass of its own weight into the wagon beneath; it is then driven to the mill, and upon a platform in which is another trap door, through which, of its own weight, the rock falls when the bottom of the wagon is opened. Under the platform is the car to receive the rock and carry it into the mill, where it is dumped upon a screen which is so arranged as to separate the rock already small enough for the crushing batteries from that which it is necessary to break at the breaking batteries, each size of rock passing to its appropriate apartment—the one size to the crushing batteries, and the other to the breaking batteries. The mill runs day and night, and works an average of forty-five tons of rock daily, and employs only eight men on a watch. This mill, as well as the Nevada Mill at Gold Hill, is owned by the Imperial Silver Mining Company, of which J. C. Corey is superintendent. The company crushes rock from its own mine, in the celebrated Gold Hill Proper, and being the same heretofore owned by Holmes & Logan, and by the Alta Company. Its President is Samuel Merritt, M. D., of San Francisco, California, and its Trustees are Samuel Merritt, Nathaniel Page, J. R. Logan, A. B. Paul, J. P. Holmes, W. W. Nichols and Giles H. Gray.

FREEBORN & SHELDON'S MILL, formerly Shaw's, is situated on the east side of Carson River, three quarters of a mile below Dayton. The entire establishment is on a large scale, the building being seventy-five feet square, and the machinery driven by a Turbine wheel five feet in diameter, and weighing

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five thousand pounds, the heaviest of the kind in the country. The machinery is from the Vulcan Foundry, San Francisco. The mill, when run to its full capacity, will operate forty-eight stamps, twenty-four now being in use. The Norton pan and process are employed for amalgamating. The owners purchase their rock, employ fifteen hands, and crush about thirty tons per day. The ditch and tail-race are three quarters of a mile long, and cost six thousand dollars. The entire cost of the work will be about forty thousand dollars. William Freeborn and Mark Sheldon, owners; John Vandewater, superintendent.

On Carson River, just east of Virginia, down Seven Mile Cañon, and the most convenient of access of any power in the vicinity of the mines, is an arastra mill of four arastras, and three stamps for breaking. Formerly the Frothingham Mill; now owned and operated by H. Van Horn. This will eventually be a valuable place, as the power is the whole river, with eight feet fall.

Besides these mills now completed, there are several others within a few miles of Dayton, on which work has been commenced, with a number of mill-sites yet unimproved, but which will, no doubt, be brought into requisition within a year or two at farthest.

RESIDENTS OF DAYTON.

ABBREVIATIONS.

bds.....boards. nr.....near. res.....resides. op.....opposite.

A

ADKINS J. W. wood, res Dayton
Alexander A. M. res First Avenue nr Pike
Alexander E. prop'r Washington Market, Main street
Aller John, bds Nevada Restaurant
Armintage E. hostler Overland Stables
Arnold H. W. Deputy Clerk Lyon County, bds Collins' Restaurant

Arlbarn Wm. laborer, bds Exchange Hotel
Artus B. laborer Sutro Mill
Atlantic Mill, Carson River, nr Franklin Mill

B

BABCOCK & Co. blacksmiths, etc. Main street
Ball Henry, barkeeper Overland Saloon
BANK EXCHANGE (Bradshaw & Green) Main street op Pike
Barker James, feeder Mineral Rapids Mill
Barnes Wm. laborer Eureka Mill
Barnhart John, feeder Dayton Mills
Barton James, miner, res Spring Valley
Batten George, blacksmith, res Main nr River
Beacham Miss J. D. principal school, Third nr Third Avenue
Beadle Chas. res corner Pike and Fourth Avenue
Beazleton J. B. painter, Pike nr Main
Beck Victor, feeder Island Mill
Bellers W. T. prop'r American Restaurant, Main street nr River
Beth John, feeder San Francisco Mill
Bigelow J. D. carpenter, bds Golden Eagle Hotel
Birdsall C. (T. Birdsall & Co.) Main corner River
Birdsall E. clerk with T. Birdsall & Co.
BIRDSALL T. & CO. merchants, and agents Wells, Fargo & Co. cor Main and River
Bisson A. boarding house Spring Valley
Black J. C. stock broker, bds Golden Eagle Hotel
Blackford G. W. attorney at law, office Main op River
Blust George, superintendent Atlantic Mill
Bogue B. laborer Dayton Hay Yard
Boose John P. grain and flour, Main above Pike
Boose Samuel, saloon keeper, bds Golden Eagle Hotel
Boyd Leonard, cook Union Hotel
Bradshaw E. Z. prop'r Exchange Saloon, Main nr Pike
Brainard Chas. amalgamator Mineral Rapids Mill
Brant Simon, laborer Chas. Cany Mine
Brew Robert, miner Chas. Cany Mine
Briggs Wm. L. millwright, res Third street
Britton Mrs. E. res First Avenue nr Pike
Brokener John, brewer, Main street
Bronner Frederick, res Dayton
Brown A. stone-mason, Third nr Third Avenue
Brown B. F. mining, bds Nevada Restaurant
Brown C. mill hand, bds Union Hotel
Brown Frank, mining, bds Nevada Restaurant

A0081138

ANNUAL REPORT

OF THE

SURVEYOR-GENERAL

OF THE

STATE OF NEVADA,

FOR THE YEAR 1865.

A008351

A-4

per belt, properly and generally known as the Walker River Copper Mines, though carelessly and indifferently explored, may safely be estimated to be 12 miles in width, commencing about 30 miles southeast of Dayton, and extending southerly beyond the limits of the county.

Among the most noted of the mines already discovered and located are the Constitution, Ward & Weister, and the Peacock. The Constitution has prominent croppings, which shows a ledge of 16 or 18 feet in width; the ore assaying from 20 to 30 per cent. in copper, with a large per centage of iron, and from $15 to $18 per ton in gold and silver. The Ward & Weister, adjacent to and parallel with the Constitution, is about six feet in width. The ore is pure gray sulphuret, containing native copper, assaying from 40 to 60 per cent copper, and from $25 to $30 in silver per ton. The Peacock ledge is situated about eight miles easterly from the Constitution, and three or four miles west of Walker River. Width of lode about four feet, yellow sulphuret ore, assaying about the same as the Constitution. In addition to the above, there are many other leads, of various size and richness, in the district, with which I am not sufficiently conversant at present, and of which I have not now time to make further mention. In this connection I would state that it would be difficult to obtain water within less than two miles of any of these mines, but that wood (the pinyon pine) may be had in large quantities at from six to ten miles of the mines. When transportation shall have become cheap, by railroad facilities or otherwise, or when reduction works shall have been erected to beneficiate the ore, these mines will constitute one of the leading features of the mining interest of our State.

LIST OF MILLS.

The following list embraces all the mills in our county. Thus showing that the advantages we have from water power on Carson River, and the abundance of wood in the immediate vicinity, that a large percentage of the ores reduced from the mines in Virginia District are reduced in this county:

NAMES OF MILLS.	When erected.	Capacity of engine, H. P.	Motive power.	Cords of Wood.	Size of Wheel.	Fall of water, feet.	Amount of water, in inches.	No. of Stamps.	Weight of Stamps.	No. of Pans.	Nature of Pans.
Birdsall & Carpenter	1865	....	Water	2	50 feet	....	700	30	650	20	Wheeler
Bacon	1863	45	Steam	6	....	....	....	20	650	17	Wheeler
Bartolo	1863	20	Steam	3	....	....	....	8	550	8	Knox
Cole & Co	1864	20	Steam	3	....	....	....	5	480	4	Wheeler
Devil's Gate	1861	35	Steam	5	....	....	....	8	900	10	Hepburn
Danery Mill	1863	45	Steam	5	....	....	....	15	550	15	Wooden tubs
Dayton Mill No. 1	1861	....	Water	6	8 feet	144	1,500	20	500	6	Wheeler
Dayton Mill No. 2	1864	45	Steam	1	....	....	....	15	800	8	Varney
Eagle	1864	....	Water	6	....	....	....	20	500	2	Knox
Eastern Slope	1862	45	Steam	5.5	37 feet	....	100	15	800	6	Hepburn
Excelsior Mill	1861	40	Steam	3	....	....	....	5	400	2	Knox
Eureka	1861	....	Water	....	Turbine	....	2,500	16	800	6	Hepburn
Franklin	1861	....	Water	4	Central discharge	....	2,500	10	650	18	Knox
Golden Eagle	1861	40	Steam	3.5	....	....	....	10	650	8	Wheeler
Illinois	1864	30	Steam	5	....	....	....	10	600	8	Knox
Island	1862	25	Steam	2	....	....	....	10	850	25	Tub
Lindauer & Co	1862	20	Steam and water	2.5	Cen. dis. 2.8 feet.	4.5	1,800	20	400	5	Hepburn
Metallurgical Works	1861	30	Steam	5	....	....	3,500	19	650	11	Tubs
Monitor	1865	....	Water	....	32 feet	....	....	15	480	10	Wheeler
New York and Nevada	1861	40	Steam	5.5	....	32	1,200	15	700	6	Wheeler
Ophir	1864	40	Steam and water	2.5	Turbine, 10 feet	14	....	5	450	2	Wheeler
Pioneer	1861	45	Steam	6	....	....	....	20	550	17	Hepburn
Phœnix No. 1	1861	45	Steam	7	....	....	....	24	600	15	Hepburn
Phœnix No. 2	1862	60	Steam	6	....	....	....	15	700	15	Tubs and Wh'ler
Palmyra	1864	40	Steam	4.5	....	....	....	15	650	8	Tubs and Wh'ler
Rock Point	1861	50	Steam and water	2.5	2 overshot, 13.5 ft.	14	3,600	20	534	34	Tubs
Sparrow & Trench	1861	30	Steam	6	....	....	....	10	650	12	Tubs
Sherman & Co	1862	....	Water	....	30 feet	....	....	56	550	50	Tubs and 6 Hep.
Swanaes	1862	40	Steam	5	....	32	....	20	600	19	....
Smith, D. L	1865	....	Water	....	35 feet	....	....	5	400	2	Tubs
Sacramento	1861	40	Steam	5	....	36	....	14	900	22	Tubs
San Francisco	1561	30	Steam and water	5	Central discharge	10	11	5	450	4	Tubs
Weston & Co	1862	40	Steam	30	....	....	....	12	750	12	Tubs
Weston & Co	1862	....	Water	40	45 feet	....	....	10	650	7	4 tubs and Wh'r
								15	550	9	Wheeler
								10	450	8	Tubs

REPORT

OF THE

Mineralogist of the State of Nevada

FOR THE

YEARS 1869 AND 1870.

CARSON CITY:
CHARLES L. PERKINS, State Printer.
1871.

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BELCHER.

Within the past two years twenty thousand tons of ore, yielding on an average $17 per ton, have been obtained from this mine, nearly all from the upper levels. The deepest openings are eight hundred and fifty feet below the surface. At this depth the vein is nearly barren, showing only traces of gold and silver.

LUCERNE MINE.

This mine is situated near Devil's Gate, Silver City, southeast from Gold Hill. It is opened by a shaft and tunnels to the depth of three hundred feet. The vein is well defined and the walls have clay linings. The ore produces on an average $10 per ton. The bullion assays $3 50 per ounce in silver, and $6 50 in gold. The ore is easily reduced, and the mine is worked without difficulty. The vein dips east about 45°. The country rock on the west is granite; on the east it is propolite.

WALLER'S DEFEAT, ST. LOUIS, SUCCOR,

And other mines are on the same vein, and are worked very similarly to the Lucerne, and have the same characteristics and productiveness.

LYON COUNTY.

The natural resources described in my last report as peculiar to this county, have undergone but little change. Some developments have been made, but the results are not particularly marked. Public schools and churches have been prospered, and some improvements are perceptible.

The official returns fix the popular vote, at the last general election, at six hundred and thirteen, being two hundred and eighteen less than the vote cast two years ago.

The mines in Spring Valley District, three miles west from Dayton, have recently received some attention—several abandoned claims have been relocated, and a mill with ten stamps is being erected.

In Devil's Gate District, ore of a low grade is being extracted from the Hope, Buckeye and other mines. These mines were never developed to a great extent, and will probably produce large quantities of ore.

Owing to the fine water privileges afforded by the Carson River, and the facilities of access to the mines, principally in Storey County, there are a large number of mills in Lyon County.

The Atlanta has ten stamps and six pans.
The Birdsall has thirty stamps and forty pans.
The Bacon has twenty stamps and ten pans.
The Carson Valley has twenty stamps and ten pans.
The Dancy has twenty stamps and ten pans.
Dayton Reduction has six pans.
Devil's Gate has twelve stamps and ten pans.
Excelsior has ten stamps and twenty pans.
Eureka has twenty stamps and eight pans.
Eagle Mill has two pans and four arastras.
Franklin has ten stamps and four pans.

Hope has ten stamps and six pans.
Island has ten stamps and four pans.
Illinois has twenty stamps and six pans.
Keystone has five stamps and six pans.
Kelsey has fifteen stamps and six pans.
Pioneer has fifteen stamps and ten pans.
Phenix has fifteen stamps and ten pans.
Rock Point has fifty-six stamps and forty-three pans.
Swansea has twelve stamps and ten pans.
Sacramento has fifteen stamps and eight pans.
San Francisco has ten stamps and eight pans.
Sherman has five stamps and four pans.
Tailings Mill has two pans.
Woodworth has twenty-four stamps and twelve pans.
Winter's has two stamps, two pans and two arastras.
Weston has fifteen stamps and nine pans.
French has twenty stamps and eighteen pans.

The copper mines, twenty-five miles southeast from Dayton, are not worked.

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SUTRO TUNNEL.

This tunnel was commenced in 1869, and has been prosecuted with commendable energy. It is run westward from the face of the foot-hills north of Dayton, so as to intersect the Comstock ledge at right angles at the depth of two thousand one hundred and seventy-two feet. It has been driven sixteen hundred and fifty feet. A stream, affording about twenty-five inches of water, flows from it. No valuable veins of ore have as yet been found.

It is proper to state that a large number of the mills are not running, the supply of ore having ceased.

CHURCHILL COUNTY.

There has been but little progress in the developments of the natural resources of this county within the past two years. The completion of the Central Pacific Railroad withdrew the travel and transportation almost entirely from the Overland Mail Road; consequently business ceased, and many of the stations along that road have been abandoned. The agricultural lands along the Carson River and about the Carson Lake and Sink have produced well.

The popular vote of the county at the late general election was eighty-seven; sixty-four votes less than were cast in November, 1868.

The soda mine, near Ragtown, has been opened to the depth of twelve or fifteen feet. It is situated in a small basin on the southwestern border of the desert surrounding the sink of the Carson and Humboldt Rivers. There is a pond or small lake near by, perhaps three quarters of a mile in length and from a quarter to half a mile in width, and said to be of great depth.

The water collects in the soda basin during the rainy season, and afterward gradually evaporates, leaving the soda beautifully crystalized over a space of from one to two acres in extent. From the developments recently made, it seems that this deposit has an unknown depth, and consists

A011001

BIENNIAL REPORT

OF THE

STATE MINERALOGIST

OF THE

STATE OF NEVADA,

FOR

THE YEARS 1871 AND 1872.

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be necessary to sink several hundred feet further to obtain the same level. Powerful hoisting works have been erected at each one of the shafts. In No. 2 a large amount of water has been encountered. When the pumps are allowed to stop it rises to within three hundred feet of the surface. A large machine shop has been erected at Sutro for the manufacture of all the machinery to be used by the company. There is also here a store supplied with everything necessary for use at the different works. These are issued as they are needed. The formations through which the tunnel has passed so far, are: for the first seven hundred and fifty feet, conglomerate; then trachyte three hundred and eighty feet; after this a belt of clay one hundred and fifty feet; and then comes one thousand seven hundred and fifty feet of porphyry; again three hundred and ten feet of trachyte. It is calculated that the tunnel will be completed to the Comstock lode in from two to two and a half years from the present time, providing no unlooked for obstacles are met with in the prosecution of the work.

MILLS.

The following list of quartz and tailing mills was made by Mr. George McFadden, County Assessor:

Name.	Situation.	Capacity, tons.	Stamps.	Condition.
Devil's Gate	Silver City	24	12	running
Pioneer	Silver City	30	15	running
Bacon	Silver City	40	20	running
Trench	Silver City	40	20	running
Horn	Silver City	20	10	running
Kelsey	Silver City	30	15	running
Golden Age	Silver City	10	5	running
Hope	Silver City	20	10	running
Excelsior	Gold Cañon	20	10	running
Sacramento	Gold Cañon	25	12	idle
Swansea	Gold Cañon	25	12	idle
Atlanta	Gold Cañon	20	10	running
Keystone	Gold Cañon	30	Tailings.	running
Eureka	Carson River	120	60	running
Franklin	Carson River	40	20	running
Woodworth	Carson River	48	24	running
Island	Carson River	20	10	idle
Carson Valley	Carson River	300	Tailings.	running
Desert	Carson River	25	Tailings.	running
Birdsall & Co	Dayton	300	Tailings.	running
Reservoir	Dayton	50	Tailings.	running
Rock Point	Dayton	112	56	idle
Spring Valley	Spring Valley	20	10	running
Daney	Spring Valley	30	15	idle

A011002

DEVIL'S GATE DISTRICT

Is situated in Gold Cañon. Silver City is about its central point. The mines here were worked several years ago, but for a long time they were idle, and some of them abandoned. Work, however, has been resumed here lately, and the prospects of this district never looked more encouraging than the present.

DAYTON.

This mine is located in Silver City, on the south side of the cañon. The old works on this mine are a tunnel, in which a shaft was sunk two hundred feet. A new shaft has been started, which has reached a depth of one hundred feet. New steam hoisting works are to be erected over it in the Spring. Ore from this mine is extracted in sufficient quantities to keep the Atlanta Mill—ten stamps—constantly running. This is one of the earliest locations in the district. Nothing was done on it for a number of years. During the past Summer work was resumed—the old works cleaned out, and a new shaft commenced.

BUCKEYE.

This mine is located one mile east of Silver City, in Long's Ravine. It is also one of the old locations. Steam hoisting works have been in use here, but everything was abandoned, and nothing done for a long time. Two years ago work was resumed, and now steam hoisting works were erected. An incline is down a distance of six hundred feet. Two mills, Horn and Hope, each ten-stamp, are supplied with ore from this mine. Water in considerable quantities is found, requiring an eight-inch pump to keep the mine clear. This water is carried by flumes around to Silver City, and supplies the Bacon and Trench Mills.

COOK & GEYER.

This mine is located about three quarters of a mile north of Silver City. A great amount of work was done on it last Summer, and the ore obtained here kept the Franklin Mill running. It has been idle for the last three months, but work will soon be resumed again.

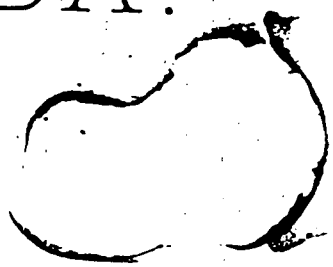
DANEY.

This mine has been abandoned. Some good ore was here near the surface, and worked out years ago. Since that time hundreds of thousands of dollars have been expended in prospecting for other bodies of ore, but nothing of any consequence has been found. Work has been stopped and renewed again several times. During the excitement of last Spring the owners were again inspired with the hope of finding something in this mine, but after several months of work they have given it up and will remove the hoisting works and other material of value.

A005023

NEVADA:

THE



LAND OF SILVER.

BY

JOHN J. POWELL,

AUTHOR OF

"The Golden State and its Resources."

SAN FRANCISCO:
BACON & COMPANY, BOOK AND JOB PRINTERS,
Corner Clay and Sansome Streets.
1876.

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LYON COUNTY—(CONTINUED).

NAME.	SITUATION.	TONS CAPACITY.	STAMPS.
Swansea	Gold Cañon	25	12
Atlanta	"	20	10
Keystone	"	30	Tailings
Eureka	Carson River	120	60
Franklin	"	40	20
Woodworth	"	48	24
Island	"	20	10
Carson Valley	"	300	Tailings
Desert	"	25	"
Birdsall & Co.	Dayton	300	"
Reservoir	"	50	"
Rock Point	"	112	56
Spring Valley	Spring Valley	20	10
Daney	"	30	15

ORMSBY COUNTY.

NAME.	LOCATION.	MOTIVE.	STAMPS.	PANS.	SETTLERS.	TONS PER DAY.
Mexican	Empire	Water	44	20	10	120
Yellow Jacket	"	Steam	40	13	6	75
Brunswick	Carson River	Water	56	26	13	150
Merrimac	"	"	20	13	6	45
Vivian	"	"	16	8	7	40
Santiago	"	"	34	9	18	80

These mills are all kept running on Comstock ores, brought from the mines and delivered by the Virginia and Truckee Railroad.

)ss.
County of Alameda.)

On this 31st day of May in the year of our Lord one thousand nine hundred and se before me, George B. M. Gray, a Notary Public in and for said County of Alameda, State of California, residing therein, duly commissioned and sworn, personally appeared Cal Broughe and W. J. Douglass known to me to be the persons described in and whose names are subscrib ed to the within instrument, and acknowledged to me that they executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal at my office in the City of Oakland, County and State aforesaid the day and year in this cert cate first above written.

(Notarial Seal) George B. M. Gray

Notary Public in and for said County of Alameda, State of California.

Recorded at request of Frank Regan, June 8th, 1907, at 4 P. M.

County Recorder.

Misc. BK. H Pg. 53

File No. 323-.

KNOW ALL MEN BY THESE PRESENTS: That we the undersigned, heretofore and now doing business under the firm name and style of Combelick & Depoali, for the purpose of preventing disputes and trouble, in case of the death of either or both of us, do by these presents covenant with each other, and declare to the whole world, and particularly to any person or persons, whom said matter may concern, that we are now, and from and after

J. L. L. P. the first day of March, in the year of our Lord One Thousand nine hundred and Seven, and until the revocation of these presents, or notice duly published by us or by our authorit be equal and undivided partners in the business of ranching, etc., in which we are now engaged, and of any other business of which we may deem proper to engage, hereby covenanting and declaring that we each own and undivided half or share in and to all lands and personal property, which we now hold, and that said property shall so remain, subject to all liens or debts existing against the same, except the individual and priv te effects o each of us. And we further declare that all accounts between us as such partners, shall b balanced on our several books and duly canceled, without leaving any sum of money due fr either one of us to the other.

In Witness Whereof, we have hereunto set our hands and seals, this 20th day of February, A. D. 1907.

Signed, sealed and delivered in the presence of John Lothrop.) John Depoali (Seal)

Henry Combellick (Seal)

State of Nevada,)
)ss.
County of Lyon.)

ON THIS 20th day of February A. D. One Thousand Nine Hundred and Seven, before me, John Lothrop, a Notary Public, in and for Lyon County, State of Nevada, duly commissioned and sworn, personally appeared John Depoali and Henry Combellick known to me to be the same persons described in, whose names are subscribed to and who executed the annexed Instrument, and who duly acknowledged to me that they executed the same freely and voluntarily, and for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal, at my office in said Lyon County, the day and year in this Certificate first above written.

(Notarial Seal)

John Lothrop.

Notary Public in and for Lyon County, State of Nevada.

Recorded at request of John Depoali June 13th, 1907 at 20 min. past 9 A. M.

Geo Randall

County Recorder.

Fee

File No. 3246.

01311

Yerington, Nevada, Feb. 22, 1907.

FOR AND IN CONSIDERATION OF the sum of one dollar ($1.00) cash to us in hand paid, by C. L. Dignowity of Reno, Nevada, the receipt whereof is hereby acknowledged,

We, Geo. L. Budd, McCoy Chappell and G. E. Levitt, all of Yerington, Lyon County, Nevada, have this day and by these presents, do hereby grant to C. L. Dignowity, an absolute option for a period of fifteen days (15) from date hereof, to purchase from us the following named lode mining claims, situated in [illegible]

using and improving the rights and privileges hereby granted them this grant therefor shall be null and void and of none effect.

Provided also, that before the delivery of this grant the said petitioners shall pay to the Clerk of this Court the sum of Twenty-Five dollars for the use and benefit of Carson County.

J. S. Child } Probate Judge.
J. Williams }
Wm. Apgar } Selectmen.

Utah Territory }
Carson County } At Dec. adjourned Term 1860.

To the Hon Judges of the County Court of Carson County U.T.

Your petitioners citizens of Carson County U.T. and residents thereof would respectfully represent to your Honorable Body that they are the owners of the Quartz Mill property and adjacent lands by occupation, and survey under the Laws of this Territory, said said Mill heretofore known as Logans, and Holmes Mill, that said Mill was erected in 1859, and is situated on the Carson River, about Fifty rods from Chinas Town, in the aforesaid County, that said Mill is propelled by the waters of said Carson River And your petitioners having become the owners of the same by purchase are desirous of improving said Mill property and extending their ditch for the supply of Motive power for Machinery to be used in the reduction of gold and Silver ores, and for such purpose have had made a survey of a

013099

Water ditch as follows, Beginning at the point where the water is backed up from the Dam of the Logan and Holmes Mill, aforsaid, being about Six rods above said Dam, running thence down and near the West bank of Carson River below said Mill about 6 chains to a Stake, running thence North 34½° East 14½ chains, thence North 16¾° West 9½ chains, thence North 14½° West 5.44 chains, thence North 55¾° West 3 chains, thence North 18° East 2½ chains to a point of outlet in said Carson River, said proposed Water ditch being about Forty seven chains in length.

Your petitioners would further represent that publication has been made of such intended application in the manner provided by the order of this Hon. Court by two of your petitioners Isaac Keeler, and Isaac Cohen, and since the publication of said notice the said Keeler and Cohen, have sold an interest of one half in said property and privilege to Joseph Mosheimer of said County; Wherefore your petitioners respectfully ask that your Hon. Court to grant them in the proportion as aforesaid to wit: to Keeler and Cohen the one undivided half and the said Jos Mosheimer the undivided half, the right to direct all the unappropriated and waste water of said Carson River, or which may not have been heretofore lawfully granted flowing in said River at the point first described in said description of the proposed ditch being the starting point on said ditch with the right to conduct such

013100 waters through said proposed ditch a

ditches and flumes and use the same as aforsaid with the privelege of erecting a dam across said Carson River of sufficient height to answer the purpose in conducting such waters into said ditch and in such manner as will not conflict with the prior rights granted to other parties by this Hon'ble Court, with the right of way and franchise for such proposed Water ditch and flume together with such Mill Sites or Sites along the line of said proposed ditch and flume and bank of said River with the aforsaid distance as may seem advisable by your petitioners to Select, all of said rights and privileges to be granted, used and enjoyed by your petitioners as aforsaid their heirs and assignes Solely and Exclusively forever.

And this your petitioners will ever pray &c

Joseph Keller.
Isaac Cohen,

Genoa U.T.
Feb 11th 1861

Anderson & Johnson. Attys
for Petitioners

United States of America
Territory of Utah, Carson Co

In the County Court
in and for the County
of Carson. Utah Territory
Dec Term A D 1861.

In the Matter of the
petition of Joseph
Keller. Isaac Cohen
and,
For ditch and water Grants

01310

On this 12th day of February, A.D. 1861, the above petition of Joseph Keller, Isaac Cohen and Joseph Mosheemer being called up examined and duly considered by the Court it is ordered under and by virtue of the power and authority in the Court vested that the prayer of the petitioners Josep Keller, Isaac Cohen, and Jos Mosheemer be acceded to, and the Court do hereby give and grant unto them, their heirs, Executors, Administrators, or assigns all the rights and privileges therein solicited for the uses and purposes therein mentioned Provided, the same shall not interfere with any existing rights of any other person or persons under any former grant or title, and Provided that this grant shall not affect or impair the rights now existing to use the said Water for the purpose of irrigating any Ranchs, or Ranchos heretofore so granted, And the Court doth hereby so order, adjudge, and decree, Provided that unless the said parties shall within twelve months from the date of this grant lay out and expend at least the sum of five Hundred dollars in improving and using the rights hereby granted, this grant thereafter shall be null and void, and of none effect.

Provided also that before the delivery of this grant the said Petitioners shall pay to the Clerk of this Court the sum of $25. for the use and benefit of Calaveras County

013102

A. J. Uhlfelder
Probate Judge

ANNUAL REPORT

OF THE

STATE MINERALOGIST

OF THE

STATE OF NEVADA

FOR 1866.

CARSON CITY:
JOSEPH E. ECKLEY, STATE PRINTER.

A-10

List of Mills in Nevada.

NAME.	Motive Power.	Cords of Wood p'r Day.	No. of Stamps.	Weight of Stamps.	No. of Pans.	Nature of Pans.	Crushing Capacity per Day. Tons.	REMARKS.
STOREY COUNTY.								
Atlas	steam	4½	15	600	8	Hepburn	25	
Atwood	"	4½	16	.....	26-2	Knox, Wheeler	20	
Bay State	"	6	23	.....	14	Wheeler	35	
Bowers	"	4	20	10-600 10-700	30	Knox	25	
Central	"	8	13	.....	4	Hepburn	12	
Crown Point	"	5	8	500	8	Knox	8	
Comet	"	4½	16	.....	.....	.....	20	
Douglas	"	4	10	650	26	Plain	16	
Eclipse	"	4	15	.....	8	Hepburn	25	
Empire, No. 1	"	5½	21	650	29	.....	30	
Empire, No. 2	"	8	16	650	12	Wheeler	32	
Empire State	"	5	15	.....	20-2-2	Knox, Wheeler, Hepburn	15	
Gold Hill	"	3	14	8-600 6-750	24	Knox	17	
Granite	"	....	.....	.....	.....	.....	.....	Refitting.
Gould & Curry	"	20	80	.....	39-3	Hepburn, Varney	100	
Hoosier State	"	3½	8	750	24	Knox	12	
Imperial	"	6	44	600	74	Knox	..... ?	
Land's	"	5½	20	.....	10	Wheeler	30	
Mariposa	"	4	12	.....	2-6	Knox, Wheeler	15	
Marysville	"	5	9	.....	30	Plain	18	
Ogden	"	6	22	.....	12	Wheeler	20	
Pacific	"	8	30	650	15	Wheeler	50	
Petaluma	"	3½	16	700	18	Knox	26	
Piute	"	5½	20	650	12	Hepburn	30	
Rhode Island	"	8	25	650	13-8	Knox, Hepburn	40	
Rigby's	"	4	10	.....	5	Varney	12	
Rogers'	"	3½	8	.....	.....	.....	12	
Sapphire	"	5	16	750	56	Knox	28	
Simcoe	"	5	16	.....	8	Tubs, Wheeler, Hepburn	25	
Stevenson's	"	2½	8	.... 500....	10	Knox	10	
Succor	"	6	20	.....	.....	.....	26	
Summit	"	6	20	625	11-1	Wheeler, Varney	35	
Union	"	2½	14	10-650 4-500	14	.....	14	
Winfield	"	5	18	.....	8	Hepburn	30	
LYON COUNTY.								
Birdsall & Carpenter	water	2	30	650	20	Wheeler	55	
Bacon	steam	6	20	650	17	Wheeler	30	
Bartolo	"	3	8	550	8	Knox	9	
Cole & Co.	"	3	5	480	4	Wheeler	3	
Devil's Gate	"	5	8	900	10	Hepburn	14	
Daney	"	6	15	550	15	Wooden Tubs	20	
Dayton, No. 1	water	1	20	500	6	Wheeler	20	
Dayton, No. 2	steam	6	15	800	8	Varney	15	
Eagle	water	....	5	400	2	Knox	15	
Eastern Slope	steam	5½	16	800	6	Hepburn	20	
Excelsior	"	3	10	650	18	Knox	18	
Eureka	water	....	20	650	8	Wheeler	22	
Franklin	"	4	10	600	8	Knox	12	
Golden Eagle	steam	3½	10	850	25	Tubs	18	
Illinois	"	5	20	400	5	Hepburn	20	
Island	"	2	19	650	11	Tubs	14	
Lindauer & Co.	st'm & water	2½	15	480	10	Wheeler	20	Dismantled.
Metallurgical Works	steam	5	15	700	6	Wheeler	16	
Monitor	water	....	5	450	2	Wheeler	3	
New York & Nevada	steam	5½	20	550	17	Hepburn	25	
Ophir	st'm & water	2½	24	600	15	Hepburn	35	
Pioneer	steam	6	15	700	15	Tubs and Wheeler	20	
Phœnix, No. 1	"	6	15	650	8	Tubs and Wheeler	19	One of these Mills destroyed by fire during 1866.
Phœnix, No. 2	"	7	20	534	34	Tubs	28	
Palmyra	"	4½	10	650	12	Tubs	15	
Rock Point	st'm & water	2½	56	550	50	Tubs and 6 Hepburn	60	
Sparrow & Trench	steam	6	20	600	19	.....	25	
Sherman & Co.	water	....	5	400	2	.....	4	
Swansea	steam	5	14	900	22	Tubs	20	
Smith, D. L.	water	....	5	450	4	Tubs	4	
Sacramento	steam	5	12	750	12	Tubs	18	
San Francisco	st'm & water	3	10	650	7	4 Tubs and Wheeler	14	
Weston & Co.	steam	4	15	550	9	Wheeler	14	
Weston & Co.	water	....	10	450	8	Tubs	11	

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Original 1576

IN THE DISTRICT COURT

OF THE

4th Judicial District,

IN AND FOR THE

COUNTY OF Lemhi

Ly. P. Howe

vs.

J. D. Winters
et al.

Writ of Attachment.

FILED, January 22nd 186[illegible]

H. A. Landers
CLERK.

Returned Feby 3rd, 1868.

By H. A. Landers
~~DEPUTY~~ CLERK.

ATTORNEY.

013092

State of Nevada
County of Lyon

I hereby certify that I recieved the within writ of Attachment January 22d 1868 at the Hour of 11 O'clock P.M. and personally served the same by attaching all the right, title and Interest of Defendants in and to the following described property to wit: situated

Lying and being (about one third (1/3) of one Mile Southerly from the town of Dayton County of Lyon State of Nevada and described as follows to wit: Beginning at a point in the centre of Carson River and about six (6) chains Southerly from a Quartz Mill formerly ~~owned~~ as Logan & Holmes and running thence 1 North Eleven degrees and fifteen minutes (11°15') West Twelve and one half (12.50) chains to a point in centre of Carson River Thence 2 North sixty eight (68) degrees West seven and one half (7.50) chains to station below and near Ditch formerly known as "Roses Ditch" Thence 3 South Twenty five degrees and forty five minutes (25°45') West five and eighty hundredth (5.80) chains to stake on lower side of said Roses Ditch Thence 4 South fifty degrees and thirty minutes (50°30') West forty two (42) Chains along eastern Slope of hill crossing "Roses Ditch" several times on line to stake No 3 Ten (10) feet below said Roses Ditch

013093 Thence 5 South thirty nine (39) degrees East forty three and twenty three hundredth (43.23)

and Forty Minutes (50,50) West forty (40) Chains along Eastern Slope of hill crossing "Rosco Ditch" several times on line to Stake No 3 Ten (10) Links below said Rosco Ditch Thence S South Forty nine (39) degrees East forty five and twenty three hundredths (45.23) Chains to Station on East side of Carson River crossing Road at nine forty seven hundredths (9.47) Chains and Carson River at forty and twenty three hundredths (40.23) Chains Thence S North twenty one (21) degrees East three (3) Chains to Station Thence S North forty nine (39) degrees West two and one half (2.50) Chains to Station in centre of Carson River Thence S North Twenty one (21) degrees East forty nine and ninety hundredths (49.90) Chains to place of beginning Claiming all land and water West of Carson River to Western line of Survey said Survey containing one hundred and fifty five and Eighty-two hundredths (155.82) Acres as surveyed by John Day County Surveyor of Ormsby County Nevada on the 1st day of January A.D. 1864 and Recorded in the Office of

(2)

013094

IN THE DISTRICT COURT

(39) degrees West - Two and one half (2½)
Chains to Station in center of Carson River
Thence S North - Twenty one (21) degrees East
Forty nine and Ninety hundredths (49.90)
Chains to place of beginning
Claiming all land and water West of
Carson River to Western line of Survey
said Survey containing One hundred and
fifty-five and Eighty-two hundredths
(155.82) Acres as surveyed by John
Day County Surveyor of Lyon County
Nevada on the 15th day of January
A.D. 1864 and Recorded in the Office of
the County Recorder of Lyon County Nev
on page 441 in Book A of Surveys
including all the water privileges Quartz Mill
Machinery and appurtenances thereunto belo
nging or pertaining equally had and enjoyed
and known as the "Dayton Quartz Mills
Also By attaching the following
described Personal and taking the same
into My possession Being at the old
Dayton Mill To wit Viz One (1) Stamp
Four (4) Hammers used for Breaking Rock
Three (3000) Pounds of old Iron More or
less Two (2) Concentrating Tillys & Bunts
One (1) Set of Blacksmith Tools

013095

One (1) Retort Two (2) Grind Stones
Twenty four (24) Crucables Two (2) Com
Sacks Three (3) Rolls of Screans Three (
Sheets of Sheet Iron Fifteen (15) Bushe
of Charcoal More or less Twenty four
(24) Empty Quick Silver Tanks Tw
(2) Pieces of Retort Pipe one (1) Set of
Carpenter tools one (1) Carpenters Benc
Two (2) Clocks Six (6) Mullers Twenty
four (24) Muller Shoes Six (6)
Porcelain Kettles one (1) Carr one (1)
Keg of Nails Four (4) Rolls of Belting
Ten (10) Picks Ten (10) Shovels
Four (4) Battery Shoes Five (5) La
Four (4) Small Varney Pans
Five Wheelbarrows Two Lots of
Brick (1.000) More or less =
Also the following Personal Proper
To Wit = (at the Dayton Steam
Quarty Mill) Fifteen Tanks of
Quicksilver (300) Pounds More or
less Two (2) Mullers Two Pone Half
(2½) Barrells of Tallow More or Less
Three (3) Battery Shoes Fifty one
(51) Sacks of Salt - Five (5) Pieces of
belting Six (6) Muller Shoes
Eighty (80) Tons of Quarty Rock
More or less Seven (7) Lamps

013096

(3)

Two (2) Wheelbarrows Four Shovel
One Thousand (1000 pounds of old
Iron More or less one (1) Set of
Small pully Blocks one (1)
Tilton & McFarland fire proof Saf
Nineteen Empty Quick Silver Tan

This 3rd day of } Geo W Shaw Sher
Feb AD 1868 } Of Lyon Co Nev

Fees 21.50

013097

In the District Court of the 4th Judicial District

OF THE ~~TERRITORY~~ State OF NEVADA,

IN AND FOR THE

COUNTY OF Lyon

Geo. P. Howe

vs.

WRIT OF ATTACHMENT.

D. D. Winters
Robert Robinson
& John Doe

The ~~People of the Territory~~ State of Nevada,

TO THE SHERIFF OF THE COUNTY OF LYON,

GREETING:

WHEREAS, the above entitled action was commenced in the District Court of the 4th Judicial District of the ~~Territory~~ State of Nevada, by the above named Plaintiff to recover from the said Defendant the sum of Three Thousand Eight Hundred & Thirty six 76/100 Dollars, or thereabouts, besides interest,

and costs of suit; and the necessary affidavit and undertaking herein having been filed as required by law:

NOW, we do therefore command you, the said Sheriff, that you attach and safely keep all the property of said defendants, or either of them, within your said County, (not exempt from execution) or so much thereof as may be sufficient to satisfy the said plaintiff's demand, as above mentioned, unless the said defendants give you security, by the undertaking of at least two sufficient sureties, in the amount sufficient to satisfy such demand, besides costs, or in an amount equal to the value of the property which has been or is about to be attached, in which case you will take such undertaking, and hereof make due and legal service and return.

WITNESS, Hon. Wm Hayden Judge of the said District Court of the 4th Judicial District, this 22nd day of Jan A. D. 1867

Attest my hand and the seal of said Court, the day and year last above written.

013098 W. A. Landes CLERK.

DEPUTY CLERK.

THE STORY OF THE MINE

AS ILLUSTRATED BY THE
GREAT COMSTOCK LODE OF NEVADA

BY

CHARLES HOWARD SHINN

ILLUSTRATED

Vintage Nevada Series
UNIVERSITY OF NEVADA PRESS
Reno, Nevada
1980

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CHAPTER III.

MORMON AND PIONEER GOLD.

WHILE eager miners were exploring the ridges and cañons of the western Sierras, the Latter-Day Saints, or Mormons, recognising the profound significance of the conquest of California and the discovery of placer gold, were making a gigantic effort to claim and conquer that great inland empire which they named the State of Deseret. The miner, whom they had learned to fear, had crossed this vast and undeveloped region, had pitched his tents where Mormon leaders were dreaming of a future seacoast possession. There was to be a struggle for that which remained. The famous State of Deseret, organized March 18, 1849, contained Utah, Nevada, Arizona, parts of Wyoming, Oregon, and Colorado, and nearly half of California, including San Diego Bay. Hundreds of the most prosperous mining camps of America lie within this huge circle.

The Mormon Church, after claiming this enormous domain, began to strengthen its outside colonies and established many others, to acquire political influence in new communities. It is easy to see that if the war with Mexico had been delayed a few years longer there might have been another independent State besides Texas, carved from Mexican territory, and treating with the United States of America as with a foreign power.

Immediately after organizing their new State the Mormons sent an expedition of eighty men into the western country, some of whom built a log cabin at "Mormon Station," in Carson Valley. After completing the "first American house in Nevada" they crossed over the Sierras and bought their suplies, also provisions to sell to the immigrants. Returning, they sold out the cargo and made a second trip to California before winter. None of these men were miners, but Beatie, the founder of this first trading station, says in his manuscript narrative, in the Bancroft Library, that in 1849, while he was in California buying supplies, one of the men left at the station washed out a little gold in the gulches near Carson Valley. On his second trip the news was told to some Mormon miners, and in the spring of 1850 men crossed the Sierras to prospect for placers.

But the real beginning of placer mining was early in 1850, when a Mormon emigrant train on the way to California camped in Carson Valley to recruit their animals, and several of the party made a prospecting tour along the river and its tributaries. Near the site of the present town of Dayton, at the mouth of Gold Cañon, they found gold, though not in large quantities. The details of this discovery are interesting. On May 15th William Prouse "took a tin milk pan, went down to the creek, and washed out a little of the surface dirt." If there had been any prospectors in the party the riches of Gold Cañon would have been discovered in a short time from this clew, but the Mormons only saw the ashen-hued, barren land which they were anxious to leave; they went on, but found the great Snowy Range, as they called the Sierras, still impassable, and so they turned back to their former camp. John Orr and Nicholas Kelly now named the ravine

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though costing about twenty-four thousand dollars, including transportation and other charges. There could be but little thousand-dollar ore, even in Ophir, and so it was necessary to build mills in Washoe. A well-written paper by A. D. Hodges, Jr., of San Francisco, entitled Amalgamation at the Comstock Lode, Nevada, which was read before the American Institute of Mining Engineers in September, 1890, gives a trustworthy account of early milling operations. Many of the prominent mill men and inventors of the period were more or less controversial, and waged a dreary warfare against their rivals through numberless newspaper articles and pamphlets whose interest for modern readers has long evaporated.

Almarin B. Paul, a very able and intelligent mill man of Nevada City, began to study the silver sulphurets of the Comstock in the autumn of 1859. He treated them with the chemicals of the *patio* process, and, after many experiments, went to the mines, where he organized "Washoe Gold and Silver Mining Company No. 1." Selecting a site for his Pioneer Mill, in Gold Cañon, near Devil's Gate, he signed contracts on June 12, 1860, to work ore from Gold Hill on and after sixty days from that date. Few men would have taken such risks, for the machinery had to be made in San Francisco and transported across the Sierras, while the needed lumber was still growing in the forests. However, Paul worked as one inspired, and on August 11th, just in time to save his contracts, the steam whistle blew, and the twenty-four stamps of the Pioneer Mill began to rise and fall upon Gold Hill ore. Three hours later, and not far off, Paul's rivals, Coover and Harris, of Amador County, California, set in motion the machinery of their nine-stamp mill.

Without going into more technical details, I may

explain that Paul crushed the ore dry in his batteries, and then amalgamated it in small Knox pans, each of which held about three hundred pounds. Each charge was treated with forty pounds of quicksilver, a pint of salt, and a few ounces of copper sulphate. When Paul had fitted steam chambers to the pan bottoms his Washoe process of pan amalgamation was an acknowledged triumph, especially with Gold Hill ore, which was simpler than that of the North End mines. In a few months Paul's company began to build another and much larger mill of sixty-four stamps, introducing mechanical improvements. Other mills followed, constructed with more and more skill. The ultimate Comstock verdict was in favour of stamps of about nine hundred pounds, dropping about a hundred times a minute, and crushing wet. Since that time the amalgamating pans have been greatly improved.

When the first mills were completed, the only mines that were being worked in a manner that really indicated the permanent value of the district were the Ophir, the California, and the Mexican. As the ore was taken out of these and a few other Comstock mines it was assorted into grades. The best, which would yield one thousand dollars a ton and upward, was sacked for shipment to England, except the small amount required to keep the *arrastras* running. The second- and third-class ores were piled up for future milling. Rock that would not pay fifty dollars a ton was hardly considered worth saving.

Even after pan-amalgamation systems began to come into general use some of the early milling men, like some of the early miners, learned their business by slow degrees. They knew very little about silver ores, and so the day of the "patent-medicine-process fiend" dawned on the Comstock. Washoe was fairly

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overrun by eager inventors with chemical compounds that they felt certain would capture every particle of gold, silver, lead, copper, and other metals and grade them into separate piles. Every ragged and penniless dead beat in Virginia City buttonholed mine owners and mill men with a story of some secret process "worth millions, sir!" Sulphate of copper, salt, and quicksilver, long used by silver miners and mentioned in every mining book, were not sufficient. Neglecting the good old axiom that thorough grinding and working of the ores is the primary principle of successful milling, everybody seemed to go rainbow chasing for something that would perform impossible chemical wonders. A number actually used immense quantities of a bitter sage-brush decoction, and were thoroughly persuaded of its efficiency until a few of the newspapers praised the famous "sage-brush process" to the skies. As late as 1862 there was a mill on the Comstock that advertised reduction of ores by the "sage-brush method." It was argued that Nature had created this most bitter and worthless Artemisia for the express purpose of getting the metal out of Nevada's silver mountains!

When such absurdities as this were believed by the masses it is no wonder that half-crazy schemers with a few ponderous phrases at their command could impose upon the community with secret processes for which they wished large sums of money or royalties. They hailed from every part of the world. The Englishman had "studied silver in Cornwall," the German at Freiberg, the Spaniard in Sonora or Peru, and each and all carried the whole trick in a little bottle in his vest pocket, ready, for a consideration, to pour a few drops into the amalgamation pan.

The mill men, as I have said, caught the popular

desire for some easy and "dead-sure" method, and long after the notion of cedar and sage-brush decoctions was definitely abandoned many of them were still ransacking the drug stores of California for new and unheard-of substances to mix with the pulverized rock in the batteries. Alum, saltpetre, borax, potash; all the acids obtainable, from muriatic to sulphuric; tobacco enough for an Australian "sheep-dip"; a multitude of strange drugs and vile concoctions never before known in the mining world, and seldom since—such were some of the contents of these witch caldrons.

Meanwhile the building of new mills went on with all haste possible, at great expense and in all sorts of places, whether or not there was ore enough in sight to keep them busy. No less than seventy-six mills, costing in the aggregate six million dollars and carrying 1,153 stamps, were built and running by the end of 1861, and twenty more were planned or being built. Several Mexican *patio* yards and fifty or more *arrastras* were in existence. All this was within fifteen miles of the Comstock. The mills lined Seven-Mile, Six-Mile, and Gold Cañons, from Virginia City to the Carson River; they were scattered along the Carson for ten miles or more, and several were even on Washoe Lake.

It would seem as if the main problems were now solved and the success of the districts assured. But, notwithstanding the plenitude of energy and capital poured out, the chief result for years was loss and bitter disappointment. So many mills were built that the ore in sight in the mines could not possibly supply half of them, and the price of reduction fell to twenty or thirty dollars a ton, which did not pay the majority of the mill owners with their crude processes and high prices of labour. The whole country was so overflowing with excitement that every prospector deemed himself a

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were properly impounded in reservoirs for future working.

The problem of handling tailings severely tried the best metallurgical skill of the times. The term "tailings" as here used includes all the ore residues, or waste, whether slimes, pan tailings, or concentrates. Louis Janin and his brother, leading metallurgists on the Comstock, began to experiment with tailings as early as 1862, perfected a process, and built separate mills, gradually creating an industry which employed many men and at times yielded large profits. The most successful tailings mill was Langtry's famous Lyon Mill, at Dayton, at the mouth of Gold Cañon.

One of the heaviest expenses of mill men is for mercury used in amalgamation. Quicksilver will divide into infinitesimal particles, and the smallest particle was found to contain gold and silver. How should it all be secured? Water that seems as pure as a mountain spring, because it has passed through flumes and settling pits after leaving the mill, is yet found to contain these particles. Even as the mint authorities find it necessary to save all the dust and soot, even on the roof, and occasionally melt out the gold, so the mill owners in every district find that the profit of the district depends upon a constant attention to details, and more particularly upon adopting every possible method of securing these elusive particles. As for the quicksilver which is so necessary to miners, the Comstock ores alone have sometimes required as much as eight hundred flasks, or 61,200 pounds a month. A whole colony of people in the California Coast Range, at New Almaden, were once producing quicksilver with all their might to send to Nevada. As the miners are fond of saying, "It takes one mine to run another."

The end of all such prospecting, costly testing, experimenting with ores, and building expensive mills in any new district, is that at last it is definitely determined whether or not the ores can be worked with profit. If not, the whole place goes to ruin. Mills, roads, shafts, tunnels, houses, hotels are deserted more rapidly than they were constructed, and everything is often abandoned as not worth hauling out. Avalanches sweep away the buildings or they fall into ruins. Grizzly and panther prowl around the deserted camp where thousands of men had staked their hopes and fortunes. There are many such deserted towns in the barren mountains whose very names are forgotten. The men that founded them are dead; the trails are obliterated. There is no pasture, or forest, or farm land to tempt any one to dwell there again. It is a more profound desolation than the desolation of Tadmor or Nineveh.

But if the ore is really rich, no matter how refractory, the story of a deserted mining camp is never sealed up and put away. As long as it remains an unsolved problem in metallurgy, it attracts tireless interest in the world of mining science until some new process—cyanide, or something else—is found to do the work. Till then, the best skill of the laboratories of America and Europe is focused upon the difficulty, and new hosts of miners are only waiting the word from some discoverer to pour again into the ruined camp and dispossess the panther and the grizzly. Sometimes they find a lonely miner there who has held his claim a quarter of a century or more, waiting for some one to unlock the treasure-house; sometimes they find only his bones, for Science, unheeding, eternal, takes no count of human years.

A020050

THE

Process Used at the Comstock

REFINING COPPERY BULLION

PRODUCED BY

AMALGAMATING TAILINGS.

BY

A. D. HODGES, JR.,
BOSTON, MASS.

READ BEFORE THE AMERICAN INSTITUTE OF MINING ENGINEERS,
AT THE PITTSBURGH MEETING,
FEBRUARY, 1886.

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THE PROCESS USED AT THE COMSTOCK FOR REFINING COPPERY BULLION PRODUCED BY AMALGAMATING TAILINGS.

BY A. D. HODGES, JR., BOSTON, MASS.

THE process to be described, whatever other merits (or demerits) it may have possessed, certainly proved a financial success under the conditions of the locality where it was introduced and where a refining process had been sought previously in vain. I have ventured to bring it to the notice of the Institute in the hope that it may prove of some interest as a solution of a practical problem, such as is often presented to the metallurgist in the remote mining regions of the West.

The method was used first at the Lyon Mill at Dayton, Nevada, and has been adopted at other tailings-mills on the Comstock. These mills treat two classes of tailings: "sand," or material which has passed previously through the pans of the ore-mills; and "slimes," or the fine clayey material which, coming from the battery, is too light to settle in the tanks inside of the mills but is caught in large reservoirs outside. The slimes, never having been worked, are naturally richer than the sands; but the assay-values of each class vary considerably among themselves. At the Lyon Mill the sand assayed from $5 to $7 and the slimes from $15 to $25 per ton.

The tailings are amalgamated in combination pans (of wood and iron) with the aid of salt and bluestone. The best results have been obtained when, through the free use of sulphate of copper, the bullion produced has been very base. At Dayton the fineness of the bullion was kept designedly at from 150 to 250.

The amalgam is taken from the canvas strainers and retorted in cylindrical iron retorts, during which process, when properly conducted, the resulting bullion separates into two distinct parts. Next to the retort-body there is a shell of compact and partially fused material, nearly white in color (and hence called locally "white bul-

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lion") with more or less of a reddish tinge. On top of this last, in the more central part of the retort, there is a reddish-brown, porous and comparatively brittle mass of what is called (by comparison) "base bullion." The latter is easily crushed and had been roasted and treated with sulphuric acid. But the white bullion had resisted all attempts before made to refine it. It was too dense to allow of crushing and its composition, about one-half silver and one-half copper, did not permit the successful use of any of the separating processes which had been tried.

The problem presented was to refine the material mentioned by some simple, cheap and quick process which did not require the establishment of any expensive plant or the services of any specially trained workmen, and which would not cause loss of precious metal. For, although the heavy and constantly increasing discount on the value of the silver in this product and the total loss of the copper (which was not paid for) rendered a refining process very desirable, yet on account of the losses incurred in previous trials the general management of the Lyon Mill had become very cautious and skeptical in the matter, and disinclined to incur any more expense in experiments. After some demur, at the end of 1873 a trial on one month's mill-run was allowed. No apparatus or material was used except that already on hand. The retort-bullion was assayed in advance and the assay-returns handed in. At the end of the experiment (during which no attempt was made to keep the fine silver separate) there was a very careful clean-up and the return in melted bullion-bars was compared with the assay reports.

Attached to the mill were sulphuric acid chambers and a bluestone factory. There were on hand a small, decrepit 5-stamp battery for crushing wet the base bullion, a small roasting furnace, dissolving tubs, crystallizers, and an old refining kettle. I afterwards substituted an iron Chili mill for the battery, and added two silver precipitating vats (using old settlers lined with lead), two or three filter-tubs, and a precipitating room; and, when the furnace was burned out, rebuilt it in a more convenient situation in a room of its own. This comprised all the new plant ever erected.

I give here the result of the first trial as copied from my books. Assays were repeated many times, and made very exactly.

Assay Returns.

	Date	Ozs.	Assay Fineness.			Ounces of Pure Metal.			Ounces of Pure Metal.		
			Ag.	Au.	Tot'l	Ag.	Au.	Total.	Ag.	Au.	Total.
White Bullion,	Nov. 15, 1873	6,400.7	430.55	0.65	431.2	2,755.8	4.2	2,760.0			
	Dec. 2, 1873	6,473.5	433.0	0.5	433.5	2,803.0	3.3	2,806.3			
	Dec. 22, 1873	5,511.2	477.75	0.55	478.3	2,633.0	3.0	2,636.0			
	Dec. 27, 1873	2,621.1	485.75	0.55	486.3	1,274.8	1.4	1,276.2	9,466.6	11.9	9,478.5
Base Bullion,	Dec. 9, 1873	9,389.5	67.15	1.93	69.1	630.5	18.3	648.8			
	Dec. 26, 1873	16,038.0	70.05	2.15	72.2	1,123.4	34.5	1,157.9			
	Jan. 1, 1874	11,066.2	69.55	1.75	71.3	769.7	19.4	789.1			
	Jan. 6, 1874	15,032.0	69.7	1.8	71.5	1,047.7	27.0	1,074.7			
	Jan. 9, 1874	10,242.5	68.55	1.75	70.3	702.1	17.9	720.0	4,273.4	117.1	4,390.5
									13,740.0	129.0	13,869.0

Return in Melted Bullion.

Bar.	Date.	Ozs.	Assay Fineness.			Ounces of Pure Metal.			Ounces of Pure Metal.		
			Ag.	Au.	Tot'l	Ag.	Au.	Total.	Ag.	Au.	Total.
868-869	Dec., 1873	2,120.0	960.3	24.7	985.0	2,035.8	52.4	2,088.2			
870	Jan., 1874	997.0	966.25	8.25	909.5	944.0	8.2	947.2			
871	Jan., 1874	715.0	885.5	32.6	918.1	633.1	23.3	656.4			
872-878	Jan., 1874	2,023.0	964.85	3.15	968.0	1,952.0	6.3	1,958.3			
1-2	Jan. 19, 1874	1,966.0	917.75	14.45	932.2	1,804.3	28.4	1,832.7			
3-4	Jan. 19, 1874	1,766.5	959.75	2.15	961.9	1,695.4	3.8	1,699.2			
5-6	Jan. 19, 1874	2,075.0	976.1	2.1	978.2	2,026.2	4.4	2,029.6			
7-8	Jan. 19, 1874	1,650.0	957.4	2.2	959.6	1,579.7	3.6	1,583.3			
9-10*	Jan. 19, 1874	1,812.0	584.2	1.4	585.6	1,058.6	2.5	1,061.1			
			Total of bullion returns						13,728.1	127.9	13,856.0
			Total by assay as above						13,740.0	129.0	13,869.0
			Difference (practically nothing)						11.9	1.1	13.0
									0.086	0.85	0.99

The process may be summarized as follows:

The base bullion is crushed and roasted dead in a reverberatory furnace to form oxide of copper and metallic silver (and gold).

The white bullion is treated with sulphur in a closed vessel at a low heat, forming sulphide of silver and of copper. This is crushed and roasted to form oxide of copper and sulphate of silver (Ziervogel-process).

The roasted products are treated (separately as a rule) with hot dilute sulphuric acid (chamber acid). All of the copper (oxide) is thus converted into soluble sulphate. The silver sulphate also

* Clean-up bars.